

ABSTRACT:

Methods of designing optimal discrete time linear controllers are disclosed. The optimal values of the tuning parameters in a linear controller can be found by minimizing the maximum of absolute values of all poles of the discrete time closed-loop transfer function from the set point to the process variable. This is a minimax problem and can be solved without any difficulty. A constrained optimization can be used to solve this minimax problem in cases where one or more of the tuning parameters are subject to lower limit and/or upper limit constraints. The PID (proportional-integral-derivative) controller tuning problem is thus solved since PID controllers can be considered as special cases of the general linear controller.